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May 11, 2017

VIA ECFS

Marlene H. Dortch, Secretary
Federal Communications Commission
445 12th Street, S.W.
Washington, DC 20554

Re: Notice of Ex Parte Presentation, *Wireless E911 Location Accuracy Requirements*, PS Docket No. 07-114

Dear Ms. Dortch:

On May 9, 2017, representatives of Polaris Wireless, Inc. ("Polaris") met with the Federal Communications Commission's Public Safety & Homeland Security Bureau to discuss Polaris's location-based services solution and recent developments germane to the Commission's *Fourth Report and Order* adopted in the above-referenced proceeding.[1] Attending the meeting on behalf of Polaris were Tarun K. Bhattacharya, Chief Technology Officer; Karl Kessenich, Executive Director of Business Development; and Michele C. Farquhar and C. Sean Spivey, outside counsel to Polaris. The PSHSB meeting participants were: Brenda Boykin, Michael Connelly, Timothy May, and Austin Randazzo. In addition, the same Polaris representatives met with Zenji Nakazawa, Public Safety and Consumer Protection Advisor to Chairman Ajit Pai, later on the same day.

During the meetings, Polaris discussed the attached presentation slides, highlighting its ongoing technology improvements and recent successful testing efforts. Polaris stressed its commitment to delivering high-accuracy, software-based wireless solutions for both horizontal and vertical location, as demonstrated by test performance exceeding the FCC's horizontal accuracy mandate through the six-year (2021) benchmark.[2] Polaris also noted that its multi-technology, full-measurement domain hybrid system has the unique ability to co-exist with and augment legacy and third-party location solutions, while leveraging evolving sensor inputs.

[1] *In the Matter of Wireless E911 Location Accuracy Requirements*, PS Docket No. 07-114, Fourth Report and Order, 30 FCC Rcd 1259 (2015).

[2] *Id.* at 1261, ¶ 6.

Pursuant to Section 1.1206(b) of the Commission's rules, I am filing this letter electronically in the above-referenced docket. Please contact me directly with any questions.

Respectfully submitted,

Michele C. Farquhar
Partner

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Enclosure

cc (via email):

Zenji Nakazawa
Brenda Boykin
Michael Connelly
Timothy May
Austin Randazzo

Emergency Services

Location-based Services

Location Surveillance

Polaris Wireless – Location Solution Product Background and Recent Developments

Wireless E911 Location Accuracy Requirements
PS Docket No. 07-114

before the
Public Safety and Homeland Security Bureau
Federal Communications Commission

May 9, 2017

Objective

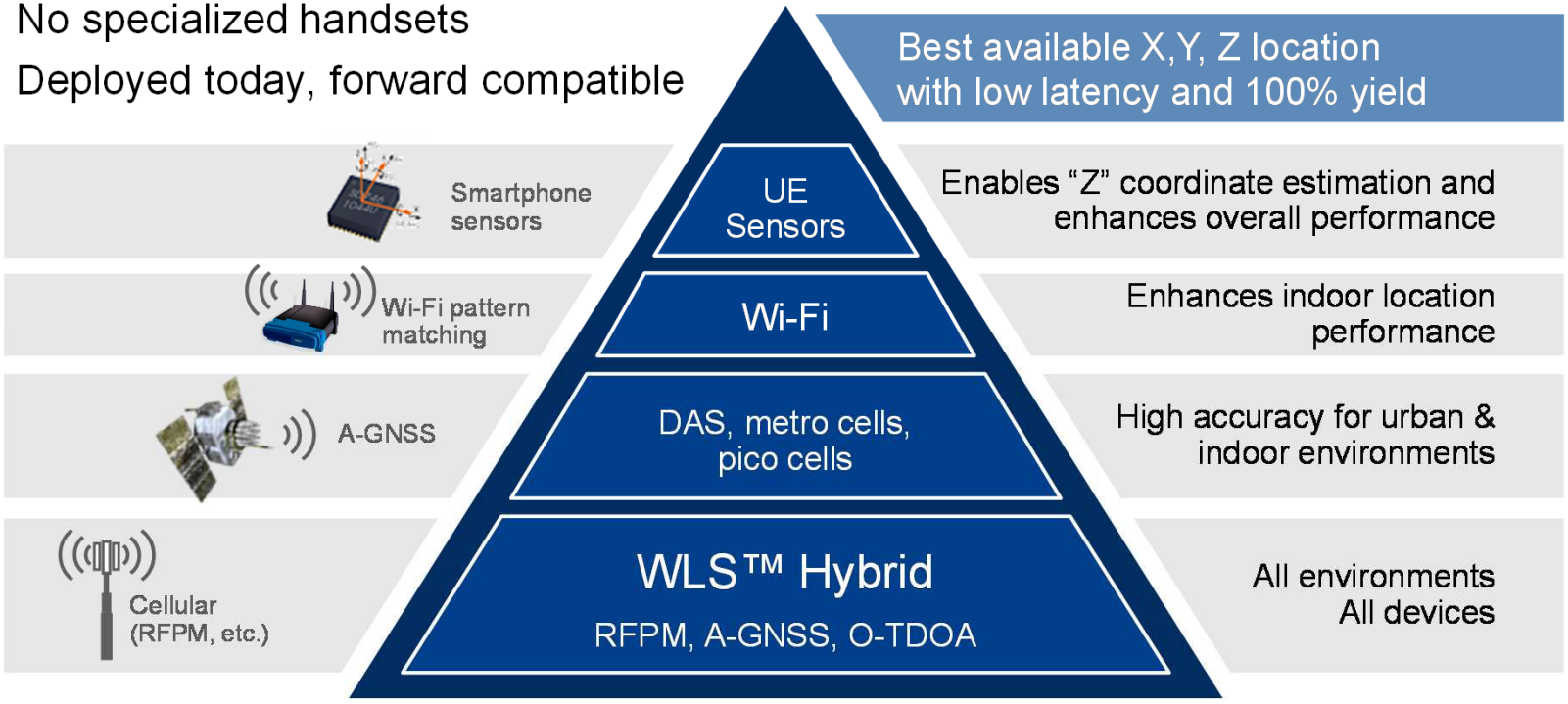
Provide highlights of Polaris Wireless location solution developments and testing

- Continuing development activities
  - Continue to evolve full measurement domain hybrid location solution
  - Continue to enhance z-axis capability

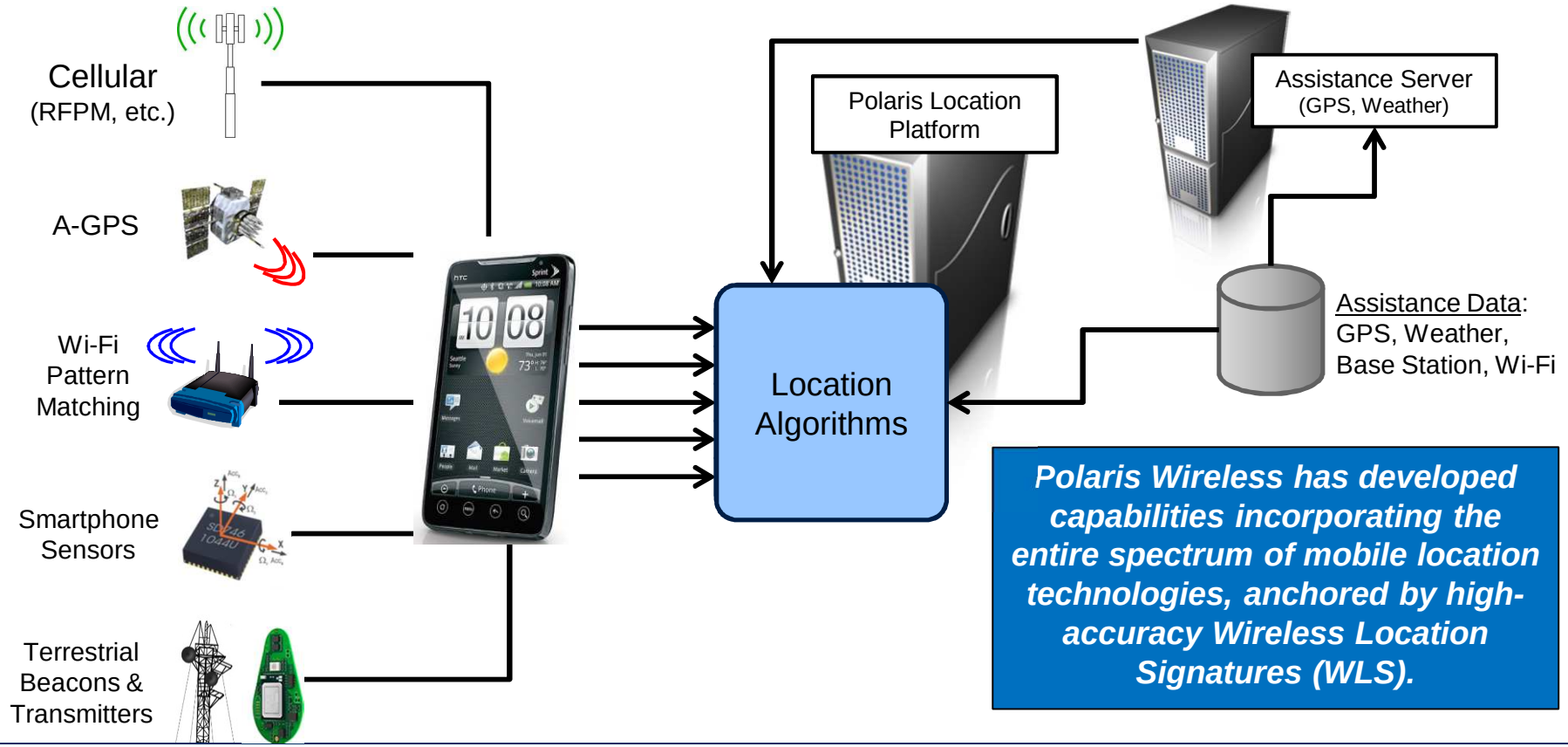
- Independent testing pursuant to the Commission's *Fourth Report and Order*
  - "Parallel" Stage 1 testing in non-nationwide carrier
    - Tested 2G and 3G, carrier has not yet deployed VoLTE
  - Stage 2 testing conducted by the Test Bed LLC
    - Tested LTE solution

Technology Evolution: Polaris Wireless Hybrid Stack

- *No new infrastructure*
- No specialized handsets
- Deployed today, forward compatible



Leverages Multiple Location Technologies and Sensor Inputs



Polaris Wireless has developed capabilities incorporating the entire spectrum of mobile location technologies, anchored by high-accuracy Wireless Location Signatures (WLS).

Parallel Stage 1 Testing

- Background
  - Polaris Wireless currently delivers an E911 solution to non-nationwide carriers not operating in either test bed city (San Francisco and Atlanta).
  - These non-nationwide carriers' solutions are not adequately represented in the test bed activities.
  - The Commission and CTIA agreed with parallel Stage 1 testing provided that it is independently and transparently administered using the methodology recommended by ATIS ESIF ESM and used by the Test Bed LLC.

- Testing
  - An independent testing company was selected to perform such testing.
  - Testing was consistent with ATIS ESIF ESM and known Test Bed LLC methodology.

Parallel Stage 1 Testing

- Performance testing was on currently deployed 2G / 3G location system
- Network supports delivery of:
  - RF signal strength measurements and timing advance
  - Assisted-GPS
- Deployed solution uses Wireless Location Signatures (WLS)
  - Hybrid of RF Pattern Matching and A-GPS
  - Two network-based backup technologies, Enhanced Cell ID and Serving Cell Location, contribute to the overall position determination system

Independent Parallel Stage 1 Overview and Test Results

- Test Overview
  - Tested on live 2G and 3G networks (simulating E911 calls), VoLTE not deployed
  - Eight commercially available, off-the-shelf devices used during the tests
  - Testing conducted by an independent testing entity, including handset procurement and provisioning
  - 15 buildings and more than 50 testpoints utilized with total number of test calls exceeding 22,000
  - All testing conducted consistent with ATIS ESIF ESM and known Test Bed LLC methodology

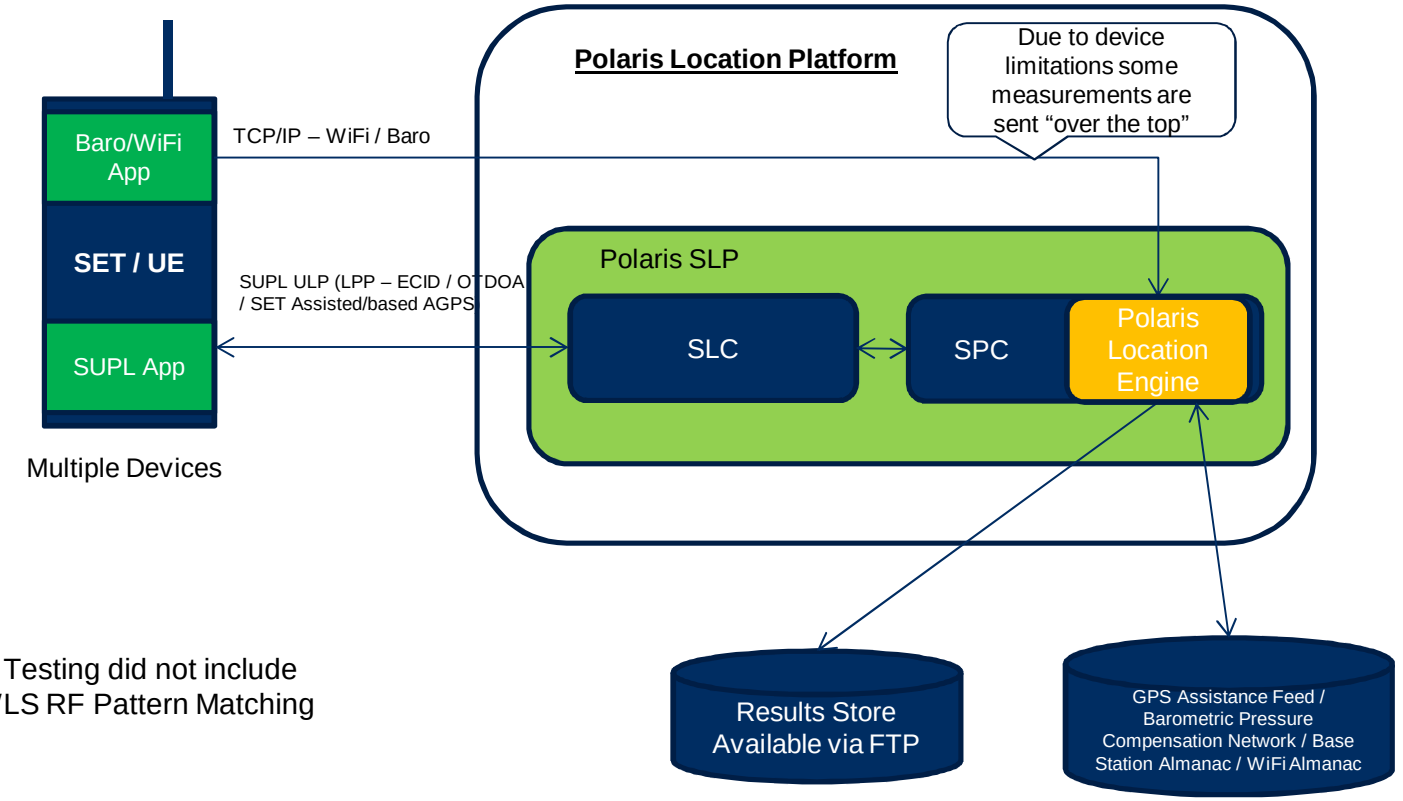
- Test Results
  - Data was analyzed incorporating actual E911 call weighting statistics
  - Demonstrated that Polaris Wireless solution exceeds the 3rd year benchmark
  - Detailed results are under NDA with the carrier

Stage 2 Testing

- Participation
  - Polaris Wireless was one of four vendors selected for Stage 2 testing
  - Received support from one Tier I carrier – network data and device support

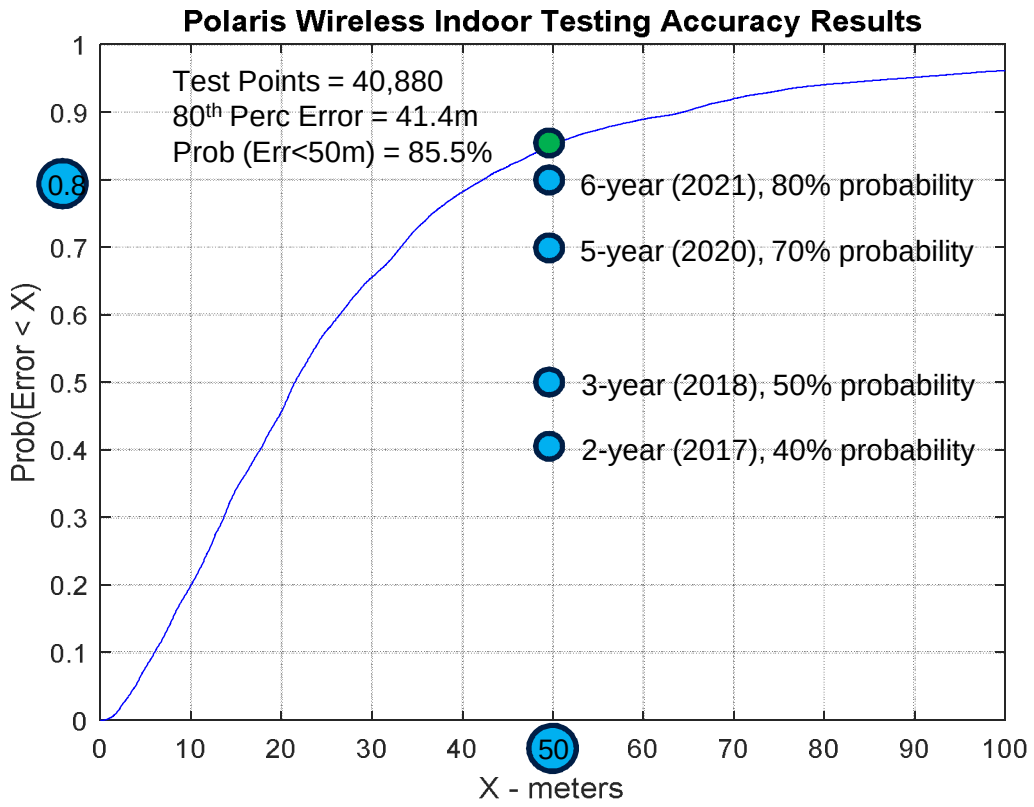
- Key Factors
  - Tested in **both** test cities – San Francisco and Atlanta
  - No custom or dedicated network hardware needed or included as part of test deployment
  - No special data collection, customization, or optimization in test cities
  - Commercial off-the-shelf devices
  - Polaris Wireless did not touch the test devices
    - Device manufacturer and Test Bed LLC performed all configuration and set-up

Polaris Wireless Stage 2 Test Platform



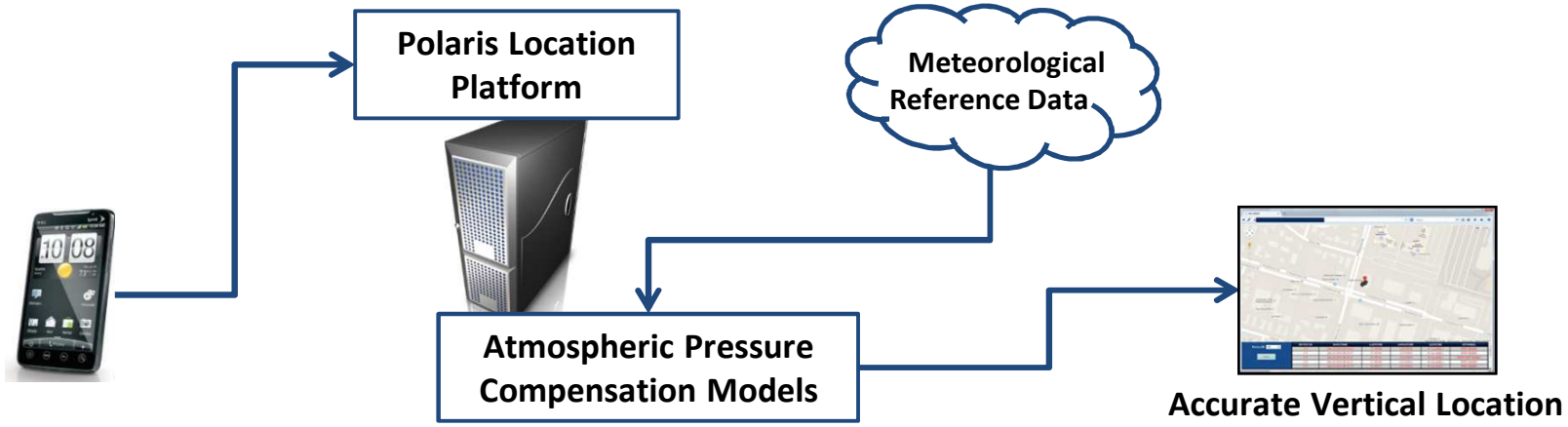
Note: Testing did not include the WLS RF Pattern Matching

Stage 2 – Overall Performance

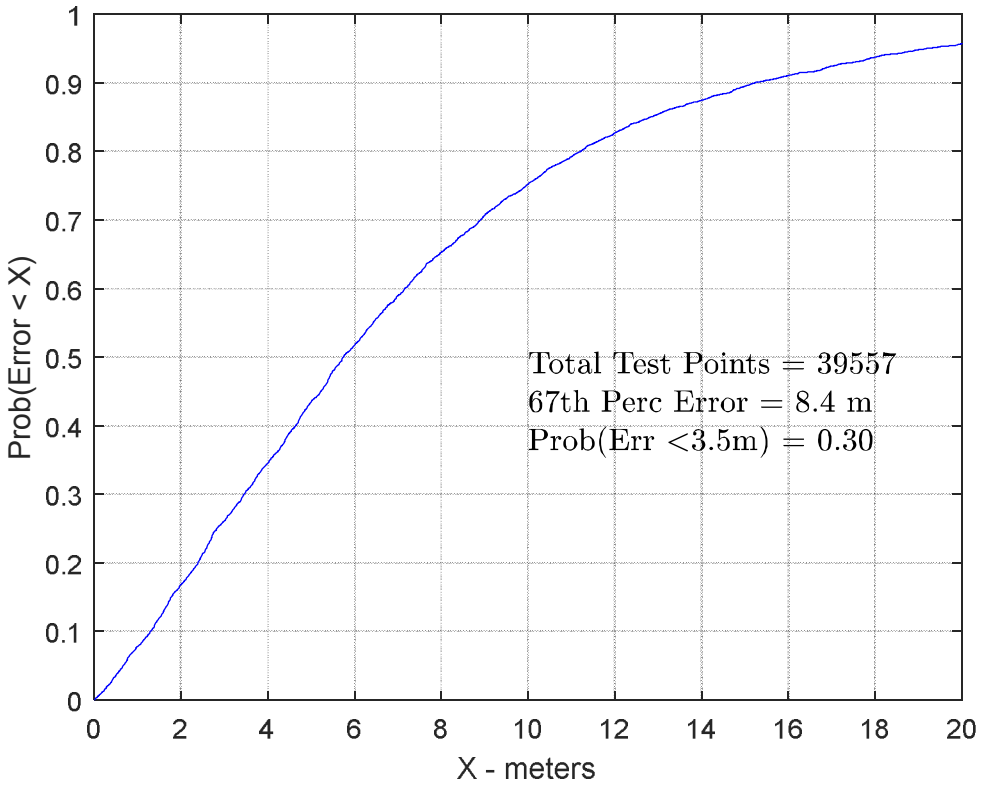


Vertical Location Solution

- Vertical solution leverages barometric sensor in the device
- Polaris Wireless has developed proprietary algorithms that address:
  - Sensor errors / bias
  - Local weather effects
  - Stack effect (e.g., HVAC)



Stage 2 – Vertical Performance based on Barometric Sensor Measurements



Note: Total Test Points represents only those test points that had a barometric pressure reading delivered from the device.

Highlighted Current Activities

- Ongoing Development
  - OTDOA Improvements – Positioning Reference Signals (PRS) muting
  - Multipath mitigation in A-GPS measurements
  - Integration of Galileo / GLONASS, for availability pursuant to regulatory approval
- Z-Axis Improvements
  - Improvements to correction models
  - Crowd-sourced sensor bias calibration
  - Improved rural models where weather station reference network is sparse
- Preparing to participate in future Test Bed vertical testing
  - Anticipated for late 2017 / early 2018
  - Implementing improvements from Stage 2 testing performance
  - Working with nationwide carriers for their support of our z-axis testing

Polaris Wireless Key Benefits

- Our Solution
  - Software-only solution – No dedicated hardware or special devices or firmware
  - Exceeds horizontal accuracy mandate through 2021 benchmark
  - Delivers vertical location
  - Can co-exist with and augment legacy and third-party location solutions
  - Future-proof – Designed to accommodate evolving sensor input

- Our Commitment
  - Investment in evolving wireless location research and development
  - Engagement with industry and standards bodies

Conclusion

- Committed to delivering high accuracy, software-based location solutions
  - Multi-technology full measurement domain hybrid
  - Horizontal and vertical location
  - Active internal research and development

- Engaging with Test Bed LLC
  - Parallel Stage 1 Testing – Demonstrated compliance with deployed 2G/3G solution
  - Stage 2 Testing – Exceeded horizontal compliance for LTE, delivered vertical location
  - Will continue to participate in applicable future stages of testing, e.g., z-axis

Polaris Wireless supports the Commission and industry efforts to improve wireless location for Public Safety

Questions?

Polaris Wireless is the global leader in providing high-accuracy, software-based, wireless location solutions. We innovate with a purpose: to solve important, yet complex, challenges for our customers in Public Safety, Internet of Things, and National Security.

Our solutions save lives, and we make the world and our communities safe.

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Thank you.

Polaris Wireless